HYBRID SYSTEM OVERVIEW

ENERGIZED & POLLUTED INSULATORS WASHING SYSTEM
For New and Operational T&D Power Lines and Gantries,
(LV/MV/HV/EHV Low, Medium, High & Extremely High Voltage)

Design, Engineering, Manufacturing and Project Management expertise on Power Lines & Power Generation Industry
Oil & Gas OEM spare parts, Mechanical works, Process Automation, Technical & Procurement services end-to-end solutions
Since 1998.

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ISO 9001 : 2015 BUREAU VERITAS CERTIFICATION NO. CH10196772
COST-EFFECTIVE MAINTENANCE SOLUTIONS TO PREVENT “TRIPS” AND POWER OUTAGES ON ENERGIZED T&D POWER LINES AND GANTRIES

HYBRID SYSTEM (HWS)
Fixed & Mobile Systems
Towers WITHOUT WASHING PLATFORMS

WASHING SYSTEMS

CLEANING ENERGIZED INSULATORS FROM POLLUTANTS

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The scope of this document is to outline and detailing the HYBRID design benefits and advantages in cleaning energized & POLLUTED insulators installed on T&D power lines, avoiding costly trips, flash-overs and power outages.
Transmission and Distribution Power lines
HYBRID WASHING SYSTEM - HWS

500 kV V-STRING SUSPENSION & TENSION TOWERS
SAMPLE PICTURES

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Transmission and Distribution Power lines

HYBRID WASHING SYSTEM - HWS

500 kV V-STRING SUSPENSION TOWER SAMPLE PICTURES
Energized & POLLUTED Insulator Fixed Washing System

Thanks to our extensive process know-how and technological expertise on Power grid and Power Generation Industry, we deliver comprehensive hot line insulators washing systems for cleaning Energized Insulators installed on LV-MV-HV-EHV Low, Medium, High & Extremely High Voltage applications:

- Transmission and Distribution Overhead Transmission Lines
- Outdoor Gantries and Substations, new installation and already operational (in service)
- LV/MV/HV/EHV (Medium, High & Extremely High Voltage)

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Customer Support Office at Wilorton Holding Inc.

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The scope of this document is to outline and detailing the HYBRID design benefits and advantages in cleaning energized insulators installed on operational (Live) overhead transmission lines, outdoor gantries and substations on a large scale power network, avoiding costly power outages and reducing maintenance costs.

The information presented is thought to be of particular benefit to a company or industry that may be initiating a cleaning program or trying to address a particular problem and it is also thought to be of value to those with an existing program based on mobile washing equipment.

The equipment, methods, tests, and safety features of the Energized Insulators “HYBRID” Washing System (AWS) design are derived and based on "live" experiences accumulated executing works in the past 21 years of activities.
ENERGIZED & POLLUTED INSULATORS “HYBRID” FIXED & MOBILE WASHING SYSTEM
(INSTALLABLE ON EXISTING AND NEW T&D TRANSMISSION LINES AND GANTRIES)

CLEANING CONTAMINATED ELECTRICAL INSULATORS OF ALL TYPES
(EXCLUDING NUCLEAR, TOXIC, AND HAZARDOUS CHEMICAL CONTAMINANTS)

MAIN OBJECTIVES AND BENEFITS OF THE HWS ARE THE CLEANING EFFICIENCY
OF THOUSANDS OF ENERGIZED INSULATORS IN MONTHS AND NOT YEARS.

The use of eventually available mobile equipment (Trucks/chassis equipped with boom/aerial platform, etc.) might be focused and limited to specific application and dedicated to general maintenance contracts and tasks, i.e.: replacement of insulators, arcing horn, vibration dampers, warning sphere, spacers, armour rod, etc.

The methods or equipment, or both, presented in this document are intended to promote the installation on existing and operational energized power lines, outdoor gantries, the “HYBRID Washing System” to maximize the washing efficiency rate, minimize and reduce the washing timing and the overall maintenance costs, avoiding costly power outages. The same advantages are obtained by installing the AUTOMATED washing system on new/operational, substations & gantries.

Normative references:

The following referenced documents are applicable to the Energized Insulators “AUTOMATED” Washing System (EIAWS) design. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

CEI 11-27 Edition IV - CEI EN 50110: Works on electrical plants (DLgs 81/08) 2014 - Adjustment of the DL and DV distances to the CEI standard EN 50110-1
ESTI n. 407: Safety rules for works on high voltage overhead lines, Switzerland
EN 353/EN 361/EN 363: Part 1/Personal protective equipment against falls from a height - Body harnesses/Fall arrest systems
IEEE Std 4™-1995, IEEE Standard Techniques for High-Voltage Testing.3,4
IEEE Std 957-2005, Guide for cleaning insulators
Simultaneous wash of all insulators of one standard Suspension/Tension towers and Gantries and suitable structures.

The water envelopes and swamps all energized insulators installed on one structure in one surge.

In calm wind conditions, one washing cycle duration approx. 25 Seconds, for one structure. Refer to washing efficiency rate paragraph.

Water rigid piping system: installation from the tower base up to the top insulators elevation.

Piping system divides into branches at each insulators level.

Stainless steel quick coupler fixed at the tower base, connecting to the water Pumper truck high pressure hose.

Pumper trucks: to carry the washing equipment and primary water tank near the towers base; the pump outlet connecting to the washing system quick coupler installed at tower base.

Tankers trucks: carry the wash water back and fourth from production/storage area to refill the primary tank installed on the pumper trucks.
Simultaneous wash of all insulators. The water envelopes and swamps all energized insulators in one surge.
Rigid Piping System installation on existing (or new) overhead transmission lattice towers and tubular steel poles, without power outages.

Piping sizes, water flow capacity and pressure parameters are determined by the Insulator’s types and characteristics and towers/gantries/steel poles height.

Suitable spraying nozzles are installed on the piping system at required elevation. Nozzle quantity depending on the insulator’s types.

Washing water:
For washing energized insulators from 132 kV up to 765 KV with water pressure ranging from 2750 and 7000 kPa (400 to 1000 PSI) at the pump outlet, demineralized water with minimum permissible conductivity not to exceed 20 µS/cm (micro Siemens per cm) is required.

For washing 33 kV energized insulators with medium/low-pressure water ranging from 1400/2100 kPa (200/300 PSI) at the spray nozzles, demineralized water with minimum permissible conductivity not to exceed 200 µS/cm (micro Siemens per cm), is required.

Rigid Piping System shall be installed on each existing power lines structures. Fixed spray washing system design considers each type of towers/steel poles and gantries configuration (i.e.: Suspension, Tension, insulators, S/C, D/C, and kV)

Washing effectiveness may be limited by wind speed. No washing activities shall be planned with wind speed above 25 Km/H. High washing rate is achieved with calm or low speed wind conditions.

At the end of each structure washing, the demineralized water remaining in the piping system might be recovered into the storage tank.
Prerequisites: optimum site condition, service and access roads along the overhead transmission line, with calm wind conditions.

Operating **nos. 4 Tanker** trucks of suitable capacity and **nos. 4 Pumper** trucks equipped with high-end motor-pump units.

- **400-132 kV Standard Suspension Towers Nos. 160 per day**

Operating **nos. 4 Tankers** trucks of suitable capacity and **nos. 4 Pumpers** trucks equipped with mid-size motor-pump units.

- **33 kV Standard Suspension Towers Nos. 200 per day**
High pressure Water Pumping Unit mounted on a suitable 4x4/6x4/6x6 off-road chassis/truck:

Motor-pump units: skid mounted triplex plunger pumps of suitable capacity and pressure, driven by diesel engine.

- **High-end Motor-pump** units, with suitable pump capacity and working pressure deployed to carry out a simultaneous washing of all insulators of one 132, 300 and 500 kV (or higher voltage) Suspension tower.

- **Mid-size Motor-pump** units, with suitable pump capacity and working pressure deployed to carry out a simultaneous washing of all insulators of one 33 kV Standard Suspension tower.

**HIGH-END MOTOR PUMP(s):** Min. capacity: 1800 Lt./min. (476 GPM) Minimum/Maximum Working pressure, at pump nozzle 50/70 Bar (700/1000 PSI) PTO Driven

**MID-SIZE MOTOR PUMP(s):** Min. capacity: 900 Lt./min. (238 GPM) Minimum/Maximum Working pressure, at pump nozzle 50/70 Bar (700/1000 PSI) PTO Driven
**Tankers / Trailers:**
Suitable to: carry 6000/20000 Lt. min. water storage tank capacity, operate in climatic and topographic, dusty atmospheric conditions, high ambient temperatures (55 Degrees Celsius), uneven roads and continuous operations for long period.

**Tanker’s engine:**
Diesel engine water cooled, suitable to power the truck and attachment and can withstand sever load conditions and meet operational conditions. Heavy-duty cooling, fuel, lubricating system, lube oil cooling system and air system to match with operating conditions.

**Tanker’s accessories:**
Tires, Radial, Tubeless, for on/off roads. Spare tire permanently attached to the truck. Rear stop/turn/tail signals, back up lamp and license plate bracket with light. Electric horn. Rotating amber Beacon light. Air conditioning system, factory installed. Five (5) pounds dry chemical fire extinguisher secured inside cab. Two (25) pounds dry chemical extinguishers secured behind the cab at the sides of the truck.

**Off-road (if required) vehicles 6x4 / 6x6 wheels-drive Pumper Trucks:**
Payload capacity of 20000 Kg. to carry pumping unit(s), 15000 lt. capacity water tank, with accessories,

**Standard accessories:**
- Steel braided hose of suitable diameter and length with stainless steel quick coupling to connect the pump inlet to the Tanker.
- Steel braided hose of suitable diameter and length with stainless steel quick coupling to connect the pump to the quick coupler installed at the tower base.
- Constant monitor controller and sensor
- High-pressure hose reels, electric rewind with quick disconnect fittings, with 45/60 meters hoses rated 2,000, complete with wash gun.
- Grounding system
COST-EFFECTIVE MAINTENANCE SOLUTIONS TO PREVENT “TRIPS” AND POWER OUTAGES ON ENERGIZED T&D POWER LINES AND GANTRIES

HYBRID SYSTEM (HWS-WP)
Fixed & Mobile Systems Towers WITH WASHING PLATFORMS

WASHING SYSTEMS

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HYBRID WASHING SYSTEM – HWS-WP

ENERGIZED & POLLUTED INSULATORS “HYBRID” FIXED & MOBILE WASHING SYSTEM (INSTALLABLE ON EXISTING AND NEW T&D TRANSMISSION LINES AND GANTRIES)

HYBRID WASHING SYSTEM” for washing energized Insulators installed on T&D Power Lines WITH WASHING PLATFORMS
HYBRID WASHING SYSTEM for washing energized Insulators installed on T&D Power Lines WITH WASHING PLATFORMS

HYBRID WASHING SYSTEM - HWS-WP

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HYBRID WASHING SYSTEM” for washing energized Insulators installed on T&D Power Lines WITH WASHING PLATFORMS

PLAY LIVE VIDEO AT: https://www.youtube.com/watch?v=gryu5TEwg4A

http://www.wilorton.com

WILORTON HOLDING INC.
HYBRID WASHING SYSTEM" for washing energized Insulators installed on T&D Power Lines WITH WASHING PLATFORMS

380kV DC-SAUDI SEC LIVE INSULATORS WASHING – HYBRID SYSTEM
ENERGIZED & POLLUTED INSULATORS FIXED WASHING “HYBRID SYSTEM” INSTALLABLE ON EXISTING & NEW SUBSTATIONS

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